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(54) **NAILER**

(56) **References Cited**

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B25C 1/04 (2006.01)
B25C 1/00 (2006.01)

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CPC **B25C 1/08** (2013.01); **B25C 1/008**
(2013.01); **B25C 1/04** (2013.01)

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B25C 1/046; B25C 1/047; B25C 1/06;
B25C 1/10; B25C 1/188; B25C 7/00; B25C
7/02

USPC 227/8, 10, 120, 130, 136, 142, 109
See application file for complete search history.

U.S. PATENT DOCUMENTS

5,219,110 A * 6/1993 Mukoyama B25C 1/008
227/142
5,385,286 A * 1/1995 Johnson, Jr. B25C 1/047
227/142
5,839,638 A * 11/1998 Ronn B25C 1/008
227/120
6,170,729 B1 * 1/2001 Lin B25C 1/008
227/142
6,851,595 B1 * 2/2005 Lee B25C 1/008
227/142
7,318,546 B2 * 1/2008 Segura B25C 1/008
227/130
7,413,103 B1 * 8/2008 Ho B25C 1/008
227/120
7,721,927 B2 * 5/2010 Osuga B25C 1/08
123/46 SC
7,753,243 B2 * 7/2010 Brendel B25C 1/008
227/119
8,453,902 B2 * 6/2013 Jang B25C 1/008
227/142
8,499,991 B2 * 8/2013 Spasov B25C 1/003
227/131
8,550,324 B2 * 10/2013 Coleman B25C 1/008
227/142

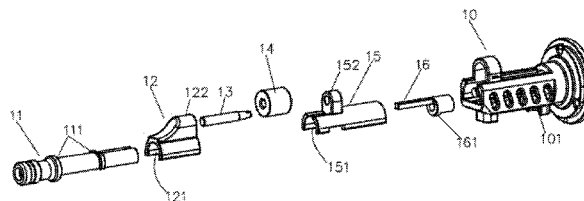
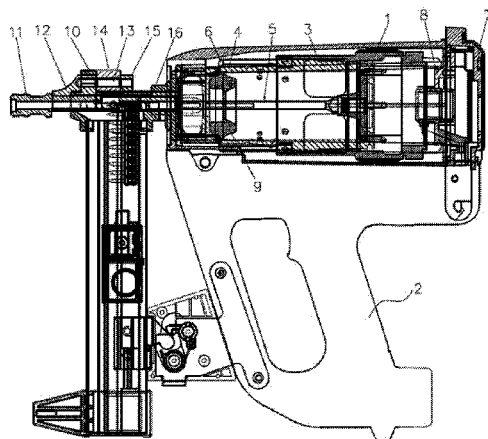
* cited by examiner

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(57) **ABSTRACT**

A nailer includes a housing, a handle connecting the hous-
ing, a combustion chamber and a cylinder inside the hous-
ing, a piston whose rear end is inside the cylinder, a cage
covering the exterior front end of the cylinder with the front
end abutting on that of the cylinder, and a pin guide
component that separately connects the nailer and further
includes a nose piece, a guide sleeve whose lower end links
the pin guide, an adjusting threaded rod whose front end
connects the upper end of the guide sleeve and rear end links
the upper end of the rear sleeve, a knob, a rear sleeve
inserted into the adjusting threaded rod and fixed between
the upper end of the guide sleeve and that of the rear sleeve,
and a piston guide. The nailer boasts capability of pin guide
replacement, quick troubleshooting and regulation of the
nail driving depth.

5 Claims, 7 Drawing Sheets



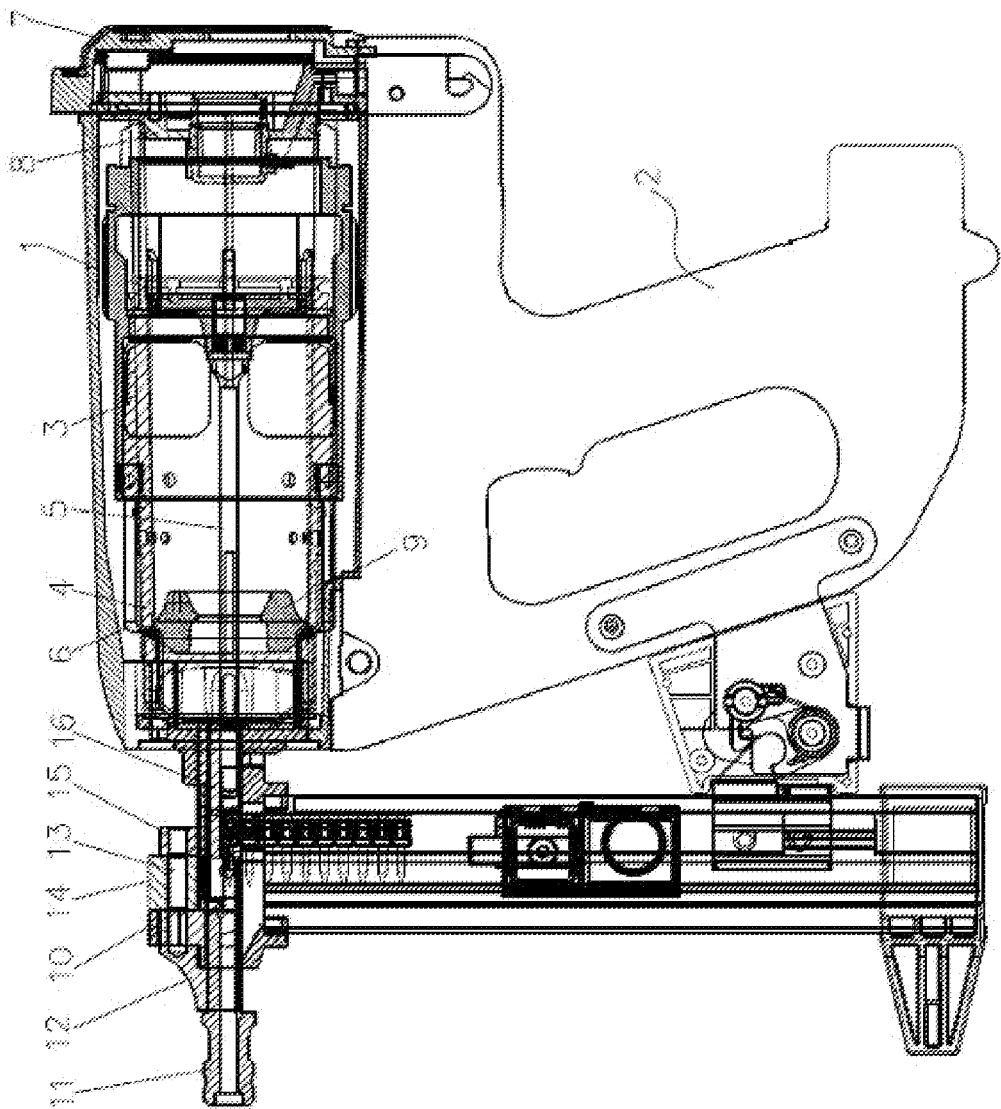


Fig. 1

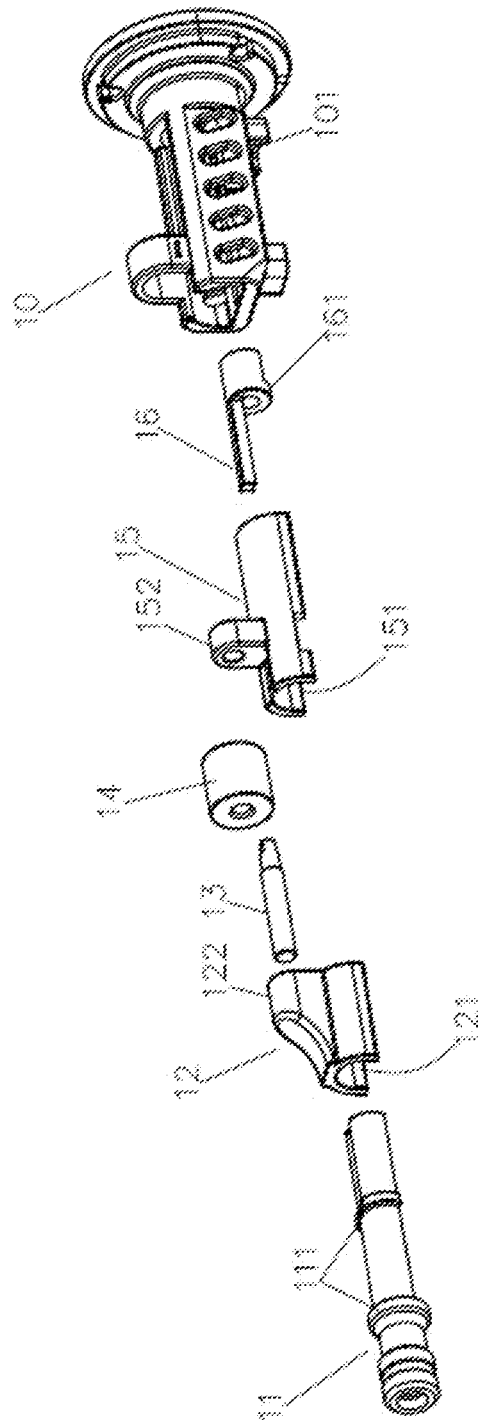


Fig. 2

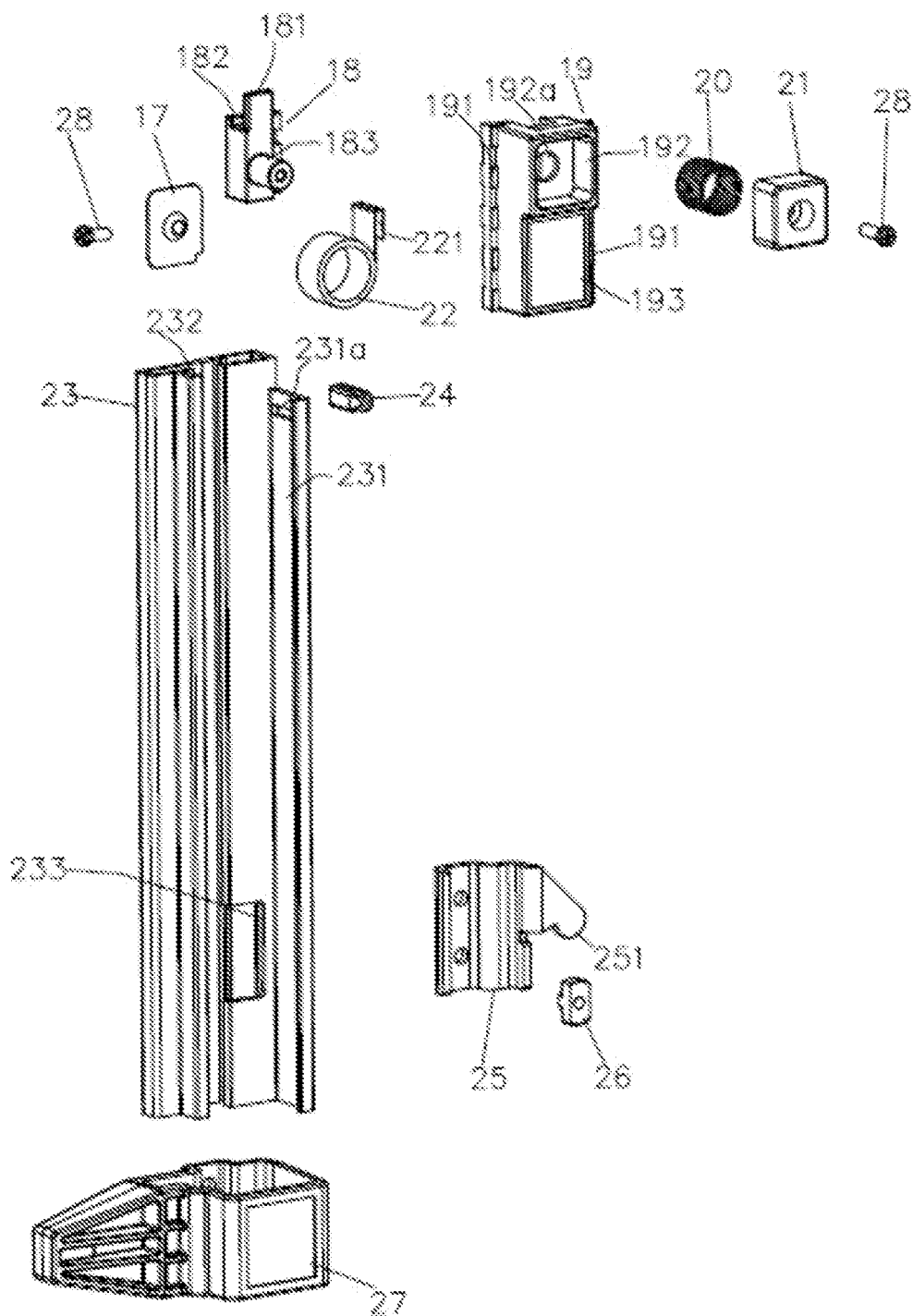


Fig. 3

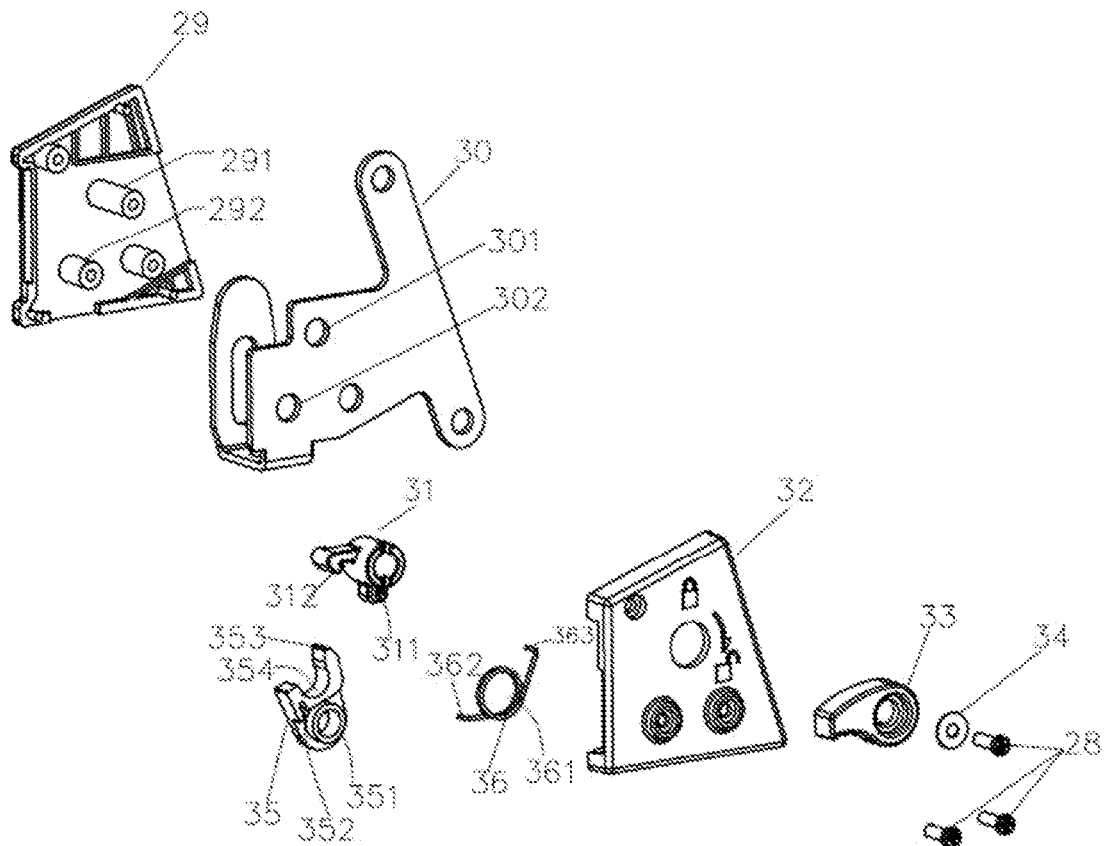


Fig. 4

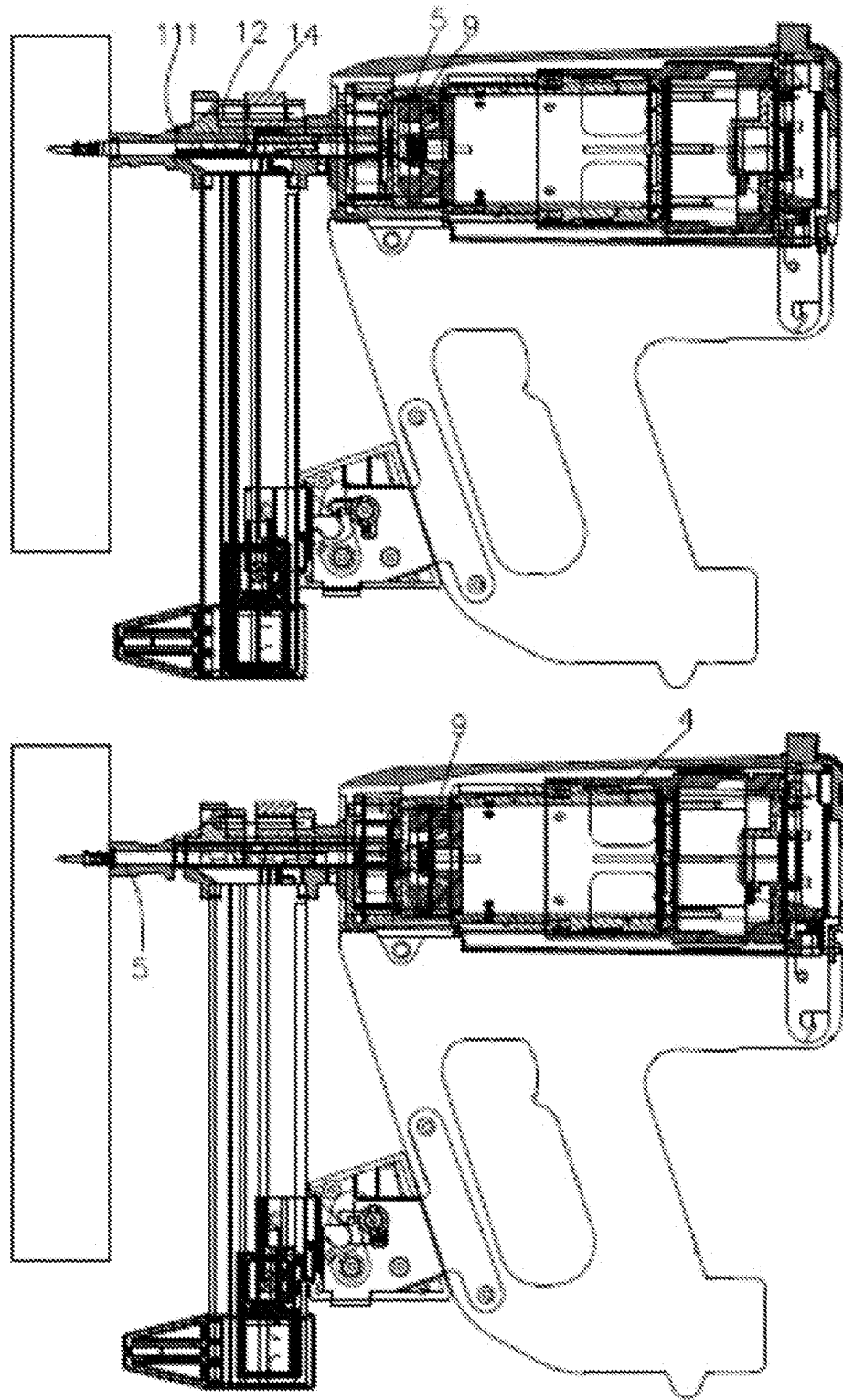


Fig. 5

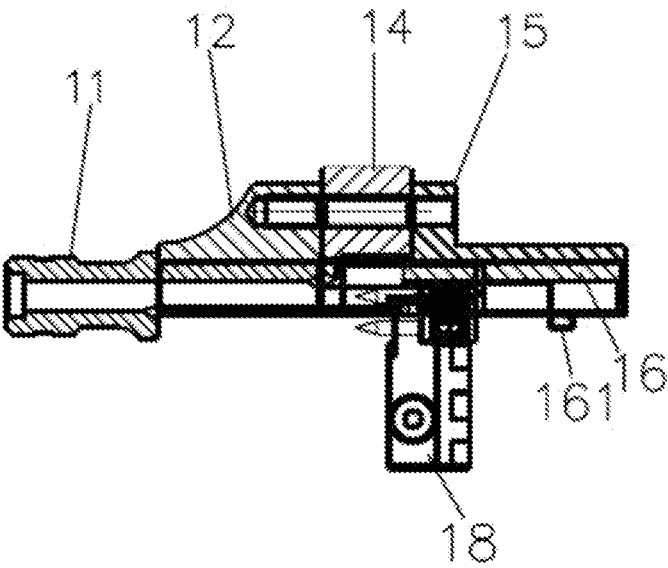


Fig. 7

1 NAILER

BACKGROUND OF THE PRESENT INVENTION

1. Field of Invention

The present invention relates to a nailer, and more particularly, to a new nailer with elements adjusting nail driving depth and facilitating quick troubleshooting.

2. Description of Related Arts

Currently, a nailer is a type of tool widely used in industries, such as construction and decoration. Commonly-seen nailers generally have a single function. For instance, the nail guide assembly cannot be dismantled and replaced with other types of nail pipes for realizing different functions and applications; the pin guide component and the track cannot be dismantled for quick troubleshooting; or the pin guide cannot be adjusted forwards or backwards to cater different requirement on the driving depth. All these will cause inconvenience in use of the nailers.

SUMMARY OF THE PRESENT INVENTION

For the abovementioned reasons, the purpose of the present invention is to provide a new nailer with elements adjusting nail driving depth and facilitating quick troubleshooting.

A new nailer, comprises a housing, a handle that connects the housing, an combustion chamber and a cylinder inside the housing, a piston whose rear end is located inside the cylinder, a cage that covers the exterior front end of the cylinder, with the front end abutting on that of the cylinder, wherein the combustion chamber wraps the exterior rear end of the cylinder, and the rear end of the cage is connected with the front end of the combustion chamber, a head cover positioned on the rear end of the housing, a cylinder head on the rear end of the cylinder, an O-ring inside the cylinder, a nose piece connected with the front end of the housing, a pin guide whose rear end is inside the guide sleeve, and a track assembly below the guide sleeve that connects with it, a pin guide component that can separately connect the nailer, which comprises a pin guide, a guide sleeve, a nose piece, an adjusting threaded rod, a knob, a rear sleeve and a piston guide, wherein the lower end of the guide sleeve is linked with the pin guide; the front end of the adjusting threaded rod is connected with the upper end of the guide sleeve while its rear end is linked with the upper end of the rear sleeve; the knob is inserted into the adjusting threaded rod and is fixed between the upper end of the guide sleeve and that of the rear sleeve, the rear end of the rear sleeve is positioned at the top of the rear end of pin guide and abuts on the front end of the cage; the front end of the piston guide is inside the rear sleeve while its lower rear end connects the pin guide.

Furthermore, two semicircular tanks are below the guide sleeve and the rear sleeve respectively. The guide sleeve is provided with two annular bosses. The lower end of the guide sleeve connects the segment of the pin guide between the two annular bosses. An arc boss is fixed below the rear end of the piston guide, which matches with a square hole on the nose piece.

A nail feeder is set above the track assembly, which includes a pin-free contact, a nail pushing head and a perforated stud.

The nailer further comprises a connection component for installation of the track assembly, which comprises a connection plate holder, a connection plate, a hook, a connection plate cover, a wrench, a washer, a guide rail lock and a

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torsional spring. The connection plate mounted on the handle is provided with a first and second hole. The connection plate holder is provided with a first and second screw column that corresponds to the first and second hole. The first screw column goes through the first hole, the hook, the connection plate cover and the wrench in sequence, and become fixed via the fastener and the washer. The second screw column goes through the second hole, the track lock and the connection plate cover in sequence, and become fixed via the fastener and the washer. The torsional spring nests the track lock, with one claw suspended on the track lock and the other claw on the hook.

The hook has a hook portion which abuts on a concave tooth of the track lock. The semicircular buckle of the guide rail buckle meshes with a semicircular notch of the track lock.

The favorable effects of the present invention: when the adjusting screw nut is rotated to separate the knob from the guide sleeve, the pin guide can be dismantled and replaced by other types of pin guides; as to failures like nail jamming, after the dismantlement of the track assembly through the connection component, the nail pipe is demounted and the nail stuck is removed, thus leading to quick troubleshooting; the adjusting threaded nut is rotated to change the total length of the pin guide and the guide sleeve, adjusting nail driving depth.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is the sectional view of the present invention seen in a certain angle;

FIG. 2 is the exploded view of the pin guide component in the present invention;

FIG. 3 is the exploded view of the track assembly in the present invention;

FIG. 4 is the exploded view of the connection component in the present invention;

FIG. 5 is the schematic view of the comparison of different nail driving depths in the present invention;

FIG. 6 is the schematic view of the installation and dismantlement of the track assembly in the present invention;

FIG. 7 is the schematic view of the connection between the piston guide and the pin guide in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

For a better understanding for those skilled in this art, the present invention is further detailed by the embodiments in combination with the drawings as below.

The nail driving direction of the nailer in the embodiments is uniformly defined as forward.

As shown in FIGS. 1-2, a new nailer comprises a housing 1, a handle 2 that connects the housing, an combustion chamber 3 and a cylinder head 4 inside the housing, a piston 5 whose rear end is located inside the cylinder head 4, a cage 6 that covers the exterior front end of the cylinder head 4, with the front end abutting on that of the cylinder, wherein the combustion chamber 3 wraps the exterior rear end of the cylinder, and the rear end of the cage 6 is connected with the front end of the combustion chamber 3, thus the connection and disconnection between the combustion chamber 3 and the cylinder head 4 can be controlled, a head cover 7 positioned on the rear end of the housing, a cylinder head 8 on the rear end of the cylinder, a bumper 9 inside the cylinder; a nail nose piece 10 connected with the front end

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of the housing, a pin guide **11** whose rear end is inside the guide sleeve, and a track assembly below the nose piece **10** that connects with it.

The nailer further comprises a guide sleeve **12**, an adjusting threaded rod **13**, a knob **14**, a rear sleeve **15** and a piston guide **16**. Two semicircular tanks **121** and **151** are below the guide sleeve **12** and the rear sleeve **15** respectively. The pin guide **11** is provided with two annular bosses **111**. The lower end of the guide sleeve **12** connects the segment of the guide sleeve **11** between the two annular bosses **111**. An arc boss **161** is fixed below the rear end of the piston guide **16**, which matches a square hole **101** on the nose piece **10**.

The front end of the adjusting threaded rod **13** is connected with the upper end **122** of the regulator while its rear end is linked with the upper end **152** of the sleeve. The knob **14** is inserted into the adjusting threaded rod **13** and located between the upper end **122** of the regulator and the upper end **152** of the sleeve. The rear end of the rear sleeve **15** is positioned inside the rear end of the nose piece **10** and abuts on the front end of the cage **6**.

As shown in FIG. 2, the nail guide components comprise the nose piece **10**, the pin guide **11** whose rear end is inside the guide sleeve, the guide sleeve **12**, the threaded screw rod **13**, the knob **14**, the rear sleeve **15** and the piston guide **16**. The order to install them is as follows. The piston guide **16** is installed firstly, with its arc boss **161** fitting into the square hole **101** that is interlinked with the inner cavity of the nose piece **10**. The rear sleeve **15** is slide into the pin guide. The semicircular tank **121** at the bottom of the guide sleeve is fixed on the segment of the pin guide **11** between the two annular bosses **111**, and the finished part as a whole is slide into the nose piece **10**. The connection portion of the adjusting threaded rod **13** and the upper end **152** of the sleeve is screwed on the driver by the adjusting threaded nut **14**. Therefore, the nail guide component is formed. If the nail guide component needs to be dismantled, this can be done in reverse order, so as to clean or remove failures.

As shown in FIG. 3, the track assembly includes a pinch plate **17**, a nail feeder **18**, a nail feeding support **19**, a spring **20**, a nail feeding button **21**, a coil spring **22**, a track **23**, a rubber stopper **24**, a track connector **25**, a track nut **26** and a track cap **27**.

The track **23** is provided with a first sliding chute **231** and a second sliding chute **232**. Lugs **191** are set on both sides of the nail feeding support **19** to match with the first and second sliding chutes. A first notch **231a** is made on the upper end of the back panel of the first sliding chute, in which a hanger **221** of the coil spring **22** is suspended and one end of the rubber stopper **24** is located. A second notch **233** is made on the back panel that is vertical to the back panel of the first sliding chute, which is diagonally below the first notch **231a**.

The track connector **25**, which is bolted on the track **23**, is provided with a semicircular buckle **251**. The track cap **27** is set below the track **23**.

The nail feeder **18** includes a pin-free contact **181**, a nail pushing head **182** and a perforated stud **183**. The nail feeding support **19** is provided with an upper receiving cavity **192** and a lower receiving cavity **193**, with a round hole **192a** on the back panel of the upper receiving cavity **192**. The perforated stud **183** goes through the round hole **192a** to be positioned inside the upper receiving cavity **192**. The spring **20** nests the perforated stud **183**, on which the nail feeding button **21** is fixed by a fastener **28** (e.g. screw). The coil spring **22** is positioned inside the lower receiving cavity **193** through the pinch plate **17** and the fastener **28** (e.g. screw).

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As shown in FIG. 4, the nailer further comprises a connection component for installation of the guide rail assembly, which comprises a connection plate holder **29**, a connection plate **30**, a hook **31**, a connection plate cover **32**, a wrench **33**, a washer **34**, a guide rail lock **35** and a torsional spring **36**. The connection plate **30** mounted on the handle **2** is provided with a first and second hole **301** and **302**. The connection plate holder **29** is provided with a first and second screw column **291** and **292** that correspond to the first and second hole. The first screw column **291** goes through the first hole **301**, the hook **31**, the connection plate cover **32** and the wrench **33** in sequence, and become fixed via the fastener **28** (e.g. screw) and the washer **34**. The first and second screw column **292** goes through the second assembling hole **302**, the track lock **35** and the connection plate cover **32** in sequence, and become fixed via the fastener **28** and the washer **34**. A ring body **361** on the torsional spring nests a column **351**, with one claw **362** suspended on the long and narrow notch **352** of the track lock and the other claw **363** on a strip-shaped hole **311** of the hook.

The hook **31** has a hook portion **312** which abuts on a concave tooth **353** of the track lock **35**. The semicircular buckle **251** of the track connector **25** meshes with a semicircular notch **354** of the track lock **35**.

FIG. 5 shows a method to adjust the nailing depth. The adjusting threaded nut **14** can be rotated to allow the contact end of the guide sleeve **12** and the pin guide **11** to abut on the annular boss **111** of the pin guide **11**, so the total length of the pin guide **11** and the nose piece **10** increases, leading to shallow nail driving depth into base material. The piston **5** is pushed out by the high temperature and pressure in the cylinder head **4** and is stopped when hitting against the bumper **9**. Consequently, nailing depth is controlled. On the contrary, if deep nail driving is in need, the adjusting threaded nut **14** is rotated in reverse direction to allow the total length of the pin guide **11** and the nose piece **10** to decrease, leading to deeper nail driving.

As shown in FIG. 6, for dismantlement of the track assembly, the wrench **33** is switched clockwise, which results in clockwise rotation of the hook **31**. Therefore, the hook portion **312** of the hook **31** separates from the concave tooth **353** of the track lock **35**, which rotates anticlockwise because of the torsional spring **36** and disconnects with the track connector **25**, leading to dismantlement of the track assembly. The end of the track **23** is inserted into the grooved body of the nose piece **10**. The semicircular buckle **251** of the track connector **25** meshes with the semicircular notch **354** of the track lock **35**, during which the hook portion **312** of the hook **31** is pushed out automatically and then hooks up the concave tooth **353** of the guide rail lock, thus locking up the track **23**.

As shown in FIG. 7, as the piston guide **16** is embedded into the square hole **101** of the nose piece **10** via the arc boss **161**, the piston guide **16** has no displacement to the right or left relative to the nose piece **10**. As a result, the front end of the piston guide **16** always blocks the way of the topmost nail during nail driving, generating supporting force that forms balance force with the upward thrust producing by the nail feeder **18**. When the last nail on the nailing strip enters into the pin guide **11**, it will not move as the pin guide does under the action of the balance force. So the topmost nail cannot be driven out by the piston. If there are two or more than two nails, movement of the nailing strip will be restricted by a square passage below the nail guide **10**.

Although the present invention is described in combination with embodiments, those skilled in the art shall know

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that any modifications and variations can be made without departing from the spirit of the present invention. Therefore, the spirit of present invention is subject to the claims.

What is claimed is:

1. A nailer, comprising a housing, a handle that connects to the housing, a combustion chamber and a cylinder inside the housing, a piston whose rear end is located inside the cylinder, a cage that covers an exterior front end of the cylinder, with a front end abutting the cylinder, wherein the combustion chamber wraps around an exterior rear end of the cylinder, and a rear end of the cage is connected with a front end of the combustion chamber, a rear cap positioned on a rear end of the housing, a cylinder head on the rear end of the cylinder, an O-ring inside the cylinder, a nose piece connected with a front end of the housing, a pin guide whose rear end is inside the nose piece, and a track assembly located below and connected with the nose piece, characterized in that the nailer further comprises a pin guide component that can separately connect to the nailer and comprises a pin guide, a nose piece, a guide sleeve, an adjusting threaded rod, a knob, a rear sleeve and a piston guide, wherein a lower end of the guide sleeve is linked with the pin guide; a front end of the adjusting threaded rod is connected with an upper end of the guide sleeve while a rear end of the adjusting threaded rod is linked with an upper end of the rear sleeve; the knob is inserted into the adjusting threaded rod and is fixed between the upper end of the guide sleeve and that of the rear sleeve; a bottom end of the rear sleeve is positioned at a rear end of the pin guide and abuts on the front end of the cage; a front end of the piston guide is inside the rear sleeve while a bottom rear end of the piston guide connects the cage.

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2. The nailer as claimed in claim 1, characterized in that two semicircular tanks are below the guide sleeve and the rear sleeve respectively; the pin guide is provided with two annular bosses; the lower end of the guide sleeve connects a segment of the pin guide between the two annular bosses; an arc boss is fixed below the rear end of the piston guide, which matches with a square hole on the nose piece.

3. The nailer as claimed in claim 1, characterized in that a nail feeder is set above the track assembly, which comprises a pin-free contact, a nail pushing head and a perforated stud.

4. The nailer as claimed in claim 1, characterized in that the nailer further comprises a connection component for installation of the track assembly, which comprises a connection plate holder, a connection plate, a hook, a connection plate cover, a wrench, a washer, a track lock and a torsional spring; the connection plate mounted on the handle is provided with a first and second hole; the connection plate holder is provided with a first and second screw column that corresponds to the first and second hole; the first screw column goes through the first hole, the hook, the connection plate cover and the wrench in sequence, and become fixed via the fastener and the washer; the second screw column goes through the second hole, the track lock and the connection plate cover in sequence, and become fixed via the fastener and the washer; the torsional spring nests the track lock, with one claw suspended on the track lock and the other claw on the hook.

5. The nailer as claimed in claim 4, characterized in that the hook has a hook portion which abuts on a concave tooth of the track lock; a semicircular buckle of a track connector meshes with a semicircular notch of the track lock.

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